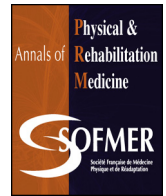




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Update article

The ecological assessment of unilateral neglect

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ABSTRACT

Conventional paper-and-pencil tests of unilateral neglect are of limited ecological validity. To address this issue, a number of assessment procedures have been proposed to provide clinicians and researchers with more ecologically valid assessments of unilateral neglect, which may be useful to plan rehabilitation and to measure the generalization of the effects of rehabilitation to daily life. We present here an overview of the different assessment measures available in the literature. The most widely used scales are the Behavioural Inattention Test (BIT), the semi-structured scales for assessment of personal and extra-personal neglect, the Subjective Neglect Questionnaire, the Baking Tray Task, the wheelchair obstacle course, the ADL-based neglect battery, and the Catherine Bergego Scale (CBS). The CBS is probably, to date, the most widely used behavioural assessment instrument for unilateral neglect. It has been found to be reliable, valid, and sensitive to change during rehabilitation. It also enables the assessment of awareness of the consequences of unilateral neglect in daily life skills.

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1. Introduction

Unilateral neglect is defined as the “failure to report, respond, or orient to novel or meaningful stimuli presented to the side opposite a brain lesion, when this failure cannot be attributed to either sensory or motor defects” [1]. This complex disorder of spatial cognition can have an impact on numerous daily living activities. Patients affected behave as if they were oblivious of half of the space around them, or even of their own body. In the most severe cases, the patient presents permanent deviation of the head and gaze towards the right, and ignores any solicitations from the side opposite to the brain lesion. During meals, the patient may upset plates located to their left, or fail to eat the food on the left side of their plate. They omit the left-hand page in a book, or they miss details situated on the left of drawings or photographs. Paterson and Zangwill [2] also noted that one of their patients could not get his left leg into his trousers, and sometimes even tried to put both legs in the same trouser leg. Unilateral neglect can also appear in other elementary activities, such as writing, drawing or games. A tendency for the patients to systematically turn right when they should be turning left, leading sometimes to erratic circular movements, was noted in the early observations [3], as

well as the occurrence of collisions with objects located to the left. Neglect can also affect the use of the body, with some patients losing motor spontaneity in their left hand, despite normal strength (motor neglect) [4].

Numerous clinical tests, whether pencil-and-paper or computerised, have been proposed to assess unilateral neglect, but they sometime lack sensitivity. A large body of research has shown the possibility of discrepancies between performance on classic clinical tests and patient functioning in everyday life, in particular among patients in the chronic phase. These discrepancies could be due to a retest effect, or to the differing nature of mechanisms involved in clinical tests and in daily life. Indeed, the administration of a test, like rehabilitation programmes, could rely essentially on mechanisms requiring the voluntary orienting of attention. In contrast, in daily life, the automatic orienting of attention is essential. A specific deficit in this particular area could reflect the persistence of a neglect behaviour contrasting with good performance on tests. These discrepancies are problematic, both for detecting difficulties that could have an impact on the patient’s daily life, and for assessment of the generalisation of effects in therapeutic trials. Several recent reviews have underlined that the absence of ecological measures of the efficacy of treatment is a frequent weakness of numerous therapeutic trials [5].

Several evaluation instruments have been proposed to assess the impact of unilateral neglect in daily life, and a few reviews have

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been published recently on assessment of unilateral neglect [6–8], or more specifically on the use of virtual reality in the assessment of neglect, which we will not discuss here because these tools are not yet in widespread use [9,10]. However, to our knowledge, no review has been devoted specifically to ecological evaluations. Yet, the issue is important, in particular for the evaluation of the efficacy of rehabilitation among patients with unilateral neglect. The aim of the present article is to present a critical review of these tools, with a particular focus on their psychometric qualities and on their limitations.

2. The Behavioural Inattention Test (BIT)

The BIT [11,12], in addition to conventional tests, comprises a set of nine tests termed “behavioural”, which simulate daily living activities, thus thought to draw closer to the real impact of the condition. The subject is asked to describe three large-sized photographs showing familiar scenes (a meal, a bathroom, and a large hospital ward), to dial a telephone number, to read a menu in four columns on an A3 format sheet, to read a newspaper article, to tell the time on a clock (digital and analogue) and to put a clock right, to point out coins among 18 items belonging to six categories, to copy an address and a sentence, to follow a route on a map, and to point out cards in an arrangement of 16 cards (Table 1).

Each subtest is scored out of 9 (with a higher score corresponding to a better performance) giving a maximum score of 81. The validation study showed that the number of patients obtaining a pathological score was larger among those with lesions in the right than in the left hemisphere, except for the item entailing following a route on a map [12]. The most discriminant subtests between patients with unilateral neglect and those without (on the basis of the pencil-and-paper test battery) was the coin-sorting task. Test–retest reliability and inter-rater reliability were satisfactory. However, the behavioural battery was not more sensitive than the conventional tests, nor was it better correlated statistically with actual difficulties experienced, assessed using an occupational therapy checklist or an autonomy measure. It is thus difficult to conclude that these subtests possess better ecological relevance than the pencil-and-paper tests included in the battery.

3. Two semi-structured scales for the assessment of personal and extra-personal hemineglect

Zoccolotti et al. [13,14] proposed an evaluation based on semi-structured situations and simulations of daily living tasks using real objects. This evaluation comprises two scales, corresponding to “extra-personal hemineglect” (serving tea, dealing cards to four people sitting round a square table, describing three complex pictures, and describing a room) and to “personal hemineglect” (use of everyday objects: razor or make-up, comb, glasses). Each item is scored from 0 (normal) to 3 (severe). Inter-rater reliability

was good. A statistical analysis of the internal validity of the test showed a differentiation between extra-personal and personal items, confirmed by single-case studies evidencing double dissociations. The extra-personal scale was significantly correlated with the pencil-and-paper tests, but this was not so for the personal scale. Thus, the distinction between these two types of hemineglect appears as one of the original contributions of this scale. Beschin and Robertson [15] refined the scoring of the personal scale by counting the number of strokes of the comb (or a razor) on each side for 30 seconds (comb and razor test). Committeri et al. [16], using these semi-structured scales, showed that bodily and extra-bodily hemineglect resulted from lesions with different topology (extra-personal hemineglect was linked mainly to a network implicating the right frontal cortex and the upper temporal regions, while personal hemineglect was linked to the right lower parietal cortex).

4. The Subjective Neglect Questionnaire [17]

The above scales require the patient to be placed in a test situation, which is therefore artificial. Towle and Lincoln [17] proposed a 19-item questionnaire administered to patients and proxies, asking them to rate the presence of difficulties in certain situations of daily living (for instance, bumping into furniture or doorways, putting only one foot on the footrest of the wheelchair, having difficulty telling the time on a clock face). Initially, each item was scored on a five-point scale according to the frequency of the occurrence of the difficulty (ranging from at most once a month to at least once a day). This scoring system however proved difficult to use, and was replaced by a binary score (present or absent in the preceding month). Scores were significantly correlated to performances on the star cancellation test. These authors also demonstrated differences between patients’ and relatives’ ratings. Finally, the relatives (unlike the patients) signalled significantly more problems among patients with unilateral neglect, in particular for the items difficulty in maintaining the trajectory for the wheelchair, clumsiness, and difficulty telling the time.

5. The Baking Tray Task

This test consists in distributing 16 cubes regularly across a board (as if they were buns on a baking tray to be put in the oven) [18]. The board measures 75 × 100 cm, and the cubes 3.5 cm. The scoring, using a grid, is based on the number of cubes in each half of the board. Double dissociations were observed between this test and classic pencil-and-paper tests, and the baking tray test appeared more sensitive than the conventional tests. The score was not significantly correlated with those of the pencil-and-paper tests. The authors tested a version with a smaller board (A4 format) on a few patients, and it appeared slightly less sensitive. The advantages of this test are its simplicity and speed of completion.

Table 1
Comparison of the main ecological scales assessing unilateral neglect.

Scale	Scoring method	Neglect components	Inter-rater reliability	Assessment of anosognosia
BIT [11,12]	Standardised testing	P	+	No
Semi-structured scale for personal and extra-personal neglect [13,14]	Observation in standardised conditions	P and EP	+	No
Subjective neglect questionnaire [17]	Questionnaire (self and proxy)	P and EP	NT	Yes
Baking tray task [18]	Testing under standardised conditions	EP	NT	No
Wheelchair obstacle course [19,20]	Testing under semi-standardised conditions	EP	NT	No
Standardised activities of daily living [21]	Standardised testing	P and EP	+	No
CBS [22–25]	Observation in naturalistic conditions and self-questionnaire	P and EP and anosognosia	+	Yes

BIT: Behavioural Inattention Test; CBS: Catherine Bergego Scale; P: personal neglect; EP: extra-personal neglect; +: good inter-rater reliability; NT: not tested.

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